



Zhirong Huang

Professor of Photon Science, of Particle Physics and Astrophysics and, by courtesy, of Applied Physics

Photon Science Directorate

Bio

ACADEMIC APPOINTMENTS

- Professor, Photon Science Directorate
- Professor, Particle Physics and Astrophysics
- Professor (By courtesy), Applied Physics
- Principal Investigator, Stanford PULSE Institute

HONORS AND AWARDS

- Fellow, American Physical Society (2015)
- Guest Professorship, Peking University (2014-2015)
- International Free Electron Laser Prize, FEL conference (2014)
- Achievement in Accelerator Physics and Technology Prize, U.S. Particle Accelerator School (2011)
- Division of Beam Physics Dissertation Award, American Physical Society (1998)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Physics (1998)
- B.S., Caltech , Physics (1992)

Teaching

COURSES

2025-26

- Synchrotron Radiation and Free Electron Lasers: Principles and Applications.: APPPHYS 325 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Rafi Hessami, Selene She

Postdoctoral Faculty Sponsor

Junzhi Wang

Doctoral Dissertation Advisor (AC)

Madison Singleton

Publications

PUBLICATIONS

- **Amazing particles and light** *INTERNATIONAL JOURNAL OF MODERN PHYSICS A*
Huang, Z.
2026
- **Dynamic motion trajectory control with nanoradian accuracy for multi-element X-ray optical systems via laser interferometry.** *Light, science & applications*
Koehlenbeck, S. M., Lee, L., Balcazar, M. D., Chen, Y., Esposito, V., Hastings, J., Hoffmann, M. C., Huang, Z., Ng, M. L., Price, S., Sato, T., Seaberg, M., Sun, et al
2025; 14 (1): 129
- **Terawatt-scale attosecond X-ray pulses from a cascaded superradiant free-electron laser** *NATURE PHOTONICS*
Franz, P., Li, S., Driver, T., Robles, R. R., Cesar, D., Isele, E., Guo, Z., Wang, J., Duris, J. P., Larsen, K., Glowonia, J. M., Cheng, X., Hoffmann, et al
2024
- **Experimental demonstration of attosecond pump-probe spectroscopy with an X-ray free-electron laser** *NATURE PHOTONICS*
Guo, Z., Driver, T., Beauvarlet, S., Cesar, D., Duris, J., Franz, P. L., Alexander, O., Bohler, D., Bostedt, C., Averbukh, V., Cheng, X., Dimauro, L. F., Doumy, et al
2024
- **Microbunch rotation in an x-ray free-electron laser using a first-order achromatic bend** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*
Margraf, R. A., Macarthur, J. P., Marcus, G., Nuhn, H., Lutman, A., Halavanau, A., Zhang, Z., Huang, Z.
2024; 27 (3)
- **Experimental Plan for Terahertz Transport Using Overmoded Iris-Line Waveguide**
Othman, M. A. K., Fisher, A. S., Naji, A., Hoffmann, M. C., Huang, Z., IEEE
IEEE.2024
- **Fast modeling of regenerative amplifier free-electron lasers** *PHYSICAL REVIEW RESEARCH*
Robles, R. R., Halavanau, A., Marcus, G., Huang, Z.
2023; 5 (4)
- **Low-loss stable storage of 1.2 & ANGS; X-ray pulses in a 14 m Bragg cavity** *NATURE PHOTONICS*
Margraf, R., Robles, R., Halavanau, A., Kryzysinski, J., Li, K., MacArthur, J., Osaka, T., Sakdinawat, A., Sato, T., Sun, Y., Tamasaku, K., Huang, Z., Marcus, et al
2023
- **Femtosecond-Terawatt Hard X-Ray Pulse Generation with Chirped Pulse Amplification on a Free Electron Laser.** *Physical review letters*
Li, H., MacArthur, J., Littleton, S., Dunne, M., Huang, Z., Zhu, D.
2022; 129 (21): 213901
- **Field analysis for a highly overmoded iris line with application to THz radiation transport** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*
Naji, A., Stupakov, G., Huang, Z., Bane, K.
2022; 25 (4)
- **Attosecond coherent electron motion in Auger-Meitner decay.** *Science (New York, N.Y.)*
Li, S., Driver, T., Rosenberger, P., Champenois, E. G., Duris, J., Al-Haddad, A., Averbukh, V., Barnard, J. C., Berrah, N., Bostedt, C., Bucksbaum, P. H., Coffee, R. N., DiMauro, et al
1800: eabj2096
- **Site-specific interrogation of an ionic chiral fragment during photolysis using an X-ray free-electron laser** *COMMUNICATIONS CHEMISTRY*
Ilchen, M., Schmidt, P., Novikovskiy, N. M., Hartmann, G., Rupprecht, P., Coffee, R. N., Ehresmann, A., Galler, A., Hartmann, N., Helml, W., Huang, Z., Inhester, L., Lutman, et al
2021; 4 (1)
- **Transverse Beam Emittance Measurement by Undulator Radiation Power Noise.** *Physical review letters*

- Lobach, I., Nagaitsev, S., Lebedev, V., Romanov, A., Stancari, G., Valishev, A., Halavanau, A., Huang, Z., Kim, K.
2021; 126 (13): 134802
- **Measurements of undulator radiation power noise and comparison with ab initio calculations** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*
Lobach, I., Nagaitsev, S., Lebedev, V., Romanov, A., Stancari, G., Valishev, A., Halavanau, A., Huang, Z., Kim, K.
2021; 24 (4)
 - **Statistical properties of spontaneous synchrotron radiation with arbitrary degree of coherence** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*
Lobach, I., Lebedev, V., Nagaitsev, S., Romanov, A., Stancari, G., Valishev, A., Halavanau, A., Huang, Z., Kim, K.
2020; 23 (9)
 - **Laguerre-Gaussian Mode Laser Heater for Microbunching Instability Suppression in Free-Electron Lasers.** *Physical review letters*
Tang, J., Lemons, R., Liu, W., Vetter, S., Maxwell, T., Decker, F. J., Lutman, A., Krzywinski, J., Marcus, G., Moeller, S., Huang, Z., Ratner, D., Carbajo, et al
2020; 124 (13): 134801
 - **Laguerre-Gaussian Mode Laser Heater for Microbunching Instability Suppression in Free-Electron Lasers** *PHYSICAL REVIEW LETTERS*
Tang, J., Liu, W., Lemons, R., Vetter, S., Maxwell, T., Decker, F., Lutman, A., Krzywinski, J., Marcus, G., Moeller, S., Ratner, D., Huang, Z., Carbajo, et al
2020; 124 (13)
 - **Simulation analysis and optimization of fresh-slice multistage free-electron lasers** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*
Guo, T., Guetg, M. W., Ding, Y., Marinelli, A., Wu, J., Huang, Z., Lutman, A. A.
2020; 23 (3)
 - **Tunable isolated attosecond X-ray pulses with gigawatt peak power from a free-electron laser** *NATURE PHOTONICS*
Duris, J., Li, S., Driver, T., Champenois, E. G., MacArthur, J. P., Lutman, A. A., Zhang, Z., Rosenberger, P., Aldrich, J. W., Coffee, R., Coslovich, G., Decker, F., Glowina, et al
2020; 14 (1): 30-+
 - **Attosecond transient absorption spooktroscopy: a ghost imaging approach to ultrafast absorption spectroscopy.** *Physical chemistry chemical physics : PCCP*
Driver, T., Li, S., Champenois, E. G., Duris, J., Ratner, D., Lane, T. J., Rosenberger, P., Al-Haddad, A., Averbukh, V., Barnard, T., Berrah, N., Bostedt, C., Bucksbaum, et al
2019
 - **Phase-Stable Self-Modulation of an Electron Beam in a Magnetic Wiggler.** *Physical review letters*
MacArthur, J. P., Duris, J., Zhang, Z., Lutman, A., Zholents, A., Xu, X., Huang, Z., Marinelli, A.
2019; 123 (21): 214801
 - **Phase-Stable Self-Modulation of an Electron Beam in a Magnetic Wiggler** *PHYSICAL REVIEW LETTERS*
MacArthur, J. P., Duris, J., Zhang, Z., Lutman, A., Zholents, A., Xu, X., Huang, Z., Marinelli, A.
2019; 123 (21)
 - **Generation and Characterization of Attosecond Pulses from an X-ray Free-electron Laser**
Li, S., Rosenberger, P., Champenois, E. G., Driver, T., Bucksbaum, P. H., Coffee, R., Gatton, A., Hartmann, G., Helml, W., Huang, Z., Knurr, J., Kling, M. F., Lin, et al
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 - **Laguerre-Gaussian Mode Laser Heater for Microbunching Instability Suppression in Free Electron Lasers**
Tang, J., Liu, W., Lemons, R., Vetter, S., Maxwell, T., Decker, F., Lutman, A., Krzywinski, J., Marcus, G., Moeller, S., Ratner, D., Huang, Z., Carbajo, et al
IEEE.2019
 - **Microbunch Rotation and Coherent Undulator Radiation from a Kicked Electron Beam** *PHYSICAL REVIEW X*
MacArthur, J. P., Lutman, A. A., Krzywinski, J., Huang, Z.
2018; 8 (4)
 - **Laguerre-Gaussian and beamlet array as second generation laser heater profiles** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*

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- Liebster, N., Tang, J., Ratner, D., Liu, W., Vetter, S., Huang, Z., Carbajo, S.
2018; 21 (9)
- **Characterizing isolated attosecond pulses with angular streaking** *OPTICS EXPRESS*
Li, S., Guo, Z., Coffee, R. N., Hegazy, K., Huang, Z., Natan, A., Osipov, T., Ray, D., Marinelli, A., Cryan, J. P.
2018; 26 (4): 4531–47
 - **Fresh-slice multicolour X-ray free-electron lasers** *NATURE PHOTONICS*
Lutman, A. A., Maxwell, T. J., MacArthur, J. P., Guetg, M. W., Berrah, N., Coffee, R. N., Ding, Y., Huang, Z., Marinelli, A., Moeller, S., Zemella, J. C.
2016; 10 (11): 745-750
 - **Polarization control in an X-ray free-electron laser** *NATURE PHOTONICS*
Lutman, A. A., MacArthur, J. P., Ilchen, M., Lindahl, A. O., Buck, J., Coffee, R. N., Dakovski, G. L., Dammann, L., Ding, Y., Durr, H. A., Glaser, L., Grunert, J., Hartmann, et al
2016; 10 (7): 468-472
 - **Linac Coherent Light Source: The first five years** *REVIEWS OF MODERN PHYSICS*
Bostedt, C., Boutet, S., Fritz, D. M., Huang, Z., Lee, H. J., Lemke, H. T., Robert, A., Schlotter, W. F., Turner, J. J., Williams, G. J.
2016; 88 (1)
 - **Analysis of shot noise suppression for electron beams** *PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS*
Ratner, D., Huang, Z., Stupakov, G.
2011; 14 (6)
 - **Two-chicane compressed harmonic generation of soft x rays** *PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS*
Ratner, D., Chao, A., Huang, Z.
2011; 14 (2)
 - **Analysis of slice transverse emittance evolution in a photocathode RF gun** *International Workshop on Frontiers in FEL Physics and Related Topics*
Huang, Z., Ding, Y., Qiang, J.
ELSEVIER SCIENCE BV.2008: 148–51
 - **Analytical analysis of longitudinal space charge effects for a bunched beam with radial dependence** *PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS*
Wu, J., Huang, Z., Emma, P.
2008; 11 (4)
 - **Statistical analysis of crossed undulator for polarization control in a self-amplified spontaneous emission free electron laser** *PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS*
Ding, Y., Huang, Z.
2008; 11 (3)
 - **Review of x-ray free-electron laser theory** *PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS*
Huang, Z., Kim, K.
2007; 10 (3)
 - **Optical klystron enhancement to self-amplified spontaneous emission free electron lasers** *PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS*
Ding, Y., Emma, P., Huang, Z., Kumar, V.
2006; 9 (7)
 - **Fully coherent x-ray pulses from a regenerative-amplifier free-electron laser** *PHYSICAL REVIEW LETTERS*
Huang, Z. R., Ruth, R. D.
2006; 96 (14)
 - **RADIATION REACTION IN A CONTINUOUS FOCUSING CHANNEL** *PHYSICAL REVIEW LETTERS*
Huang, Z., Chen, P., Ruth, R. D.
1995; 74 (10): 1759-1762